UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte MASAYUKI MISHIMA

Appeal No. 2005-2227
Application No. 09/845,356

ON BRIEF

Before GARRIS, PAK and TIMM, *Administrative Patent Judges.*

Timm, *Administrative Patent Judge.*

DECISION ON APPEAL

This appeal involves claims 25-32, the only claims pending in this application. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 134.

INTRODUCTION

The claims are directed to a white light-emitting device. Claim 25 is illustrative:

> 25. A white light-emitting device comprising an anode, at least one organic compound layer containing a light-emitting layer, and a cathode,
> wherein the light-emitting layer comprises red, green, and blue light-emitting materials in same light-emitting layer, and wherein at least one of the light-emitting materials is an orthometallated complex.

The Examiner relies on the following prior art references to show unpatentability:

Egusa et al. (Egusa)	5,294,810	Mar. 15, 1994
Forrest et al. (Forrest)	6,310,360	Oct. 30, 2001

Baldo, M. A. et al., "Very high-efficiency green organic light-emitting devices based on electrophosphorescence" Applied Physics Letters, Vol. 75, No. 1 (July 5, 1999), pp 4-6 (Baldo).

The Examiner rejects claims 25-32 under 35 U.S.C. § 103(a) as unpatentable over Baldo or Forrest either reference in view of Egusa.

We consider the issues as presented in the Answer, Brief and Reply Brief. Because the claims are argued together, we select a single claim to represent the issues on appeal. We select claim 25. Based on our review of the issues as they relate to claim 25, we affirm substantially for the reasons advanced by the Examiner and add the following primarily for emphasis.

OPINION

Claim 25 is directed to a white light-emitting device. The device includes an anode, at least one organic compound layer containing a light-emitting layer, and a cathode. The light-emitting layer comprises red, green, and blue light-emitting materials within the same layer. At least one of the light-emitting layers is an orthometallated complex. Tris(2-phenylpyridine) iridium complex, a green light-emitting material, is identified as a useful orthometallated complex (specification, p. 8, ll. 20-21 and the examples).

The Examiner has established a prima facie case of obviousness with respect to the subject matter of claim 25 as the Examiner has established that the use of various red, green, and blue light-emitting materials including tris(2-phenylpyridine) iridium complex ($Ir(ppy)_3$), a green light-emitting material, were known to be used in organic light-emitting devices (OLEDs) and

that it was within the capabilities of those of ordinary skill in the OLED art to combine those materials to obtain desirable hues of light including white (Answer, pp. 4-7). There is no dispute that $Ir(ppy)_3$ is an orthometallated complex within the meaning of claim 25.

Appellant advances two general arguments: (1) that there is no motivation to combine Baldo or Forrest and Egusa; and (2) that the combinations would not result in the white light-emitting device of the present invention (Brief, p. 13).

According to Appellant there is no motivation to combine because Egusa only discloses that the light-emission intensities of red, green, and blue can be *controlled*, there is no express disclosure of using red, green, and blue light-emitting *materials* in Egusa at column 26, lines 25-28. Appellant acknowledges that column 20, lines 57-64 of Egusa[1] discloses white light emission from separate layers of blue emitting agent and yellow emitting agent, but Appellant argues that this is not a disclosure of using red, green, and blue light-emitting materials.

Appellant's argument is not persuasive because it does not adequately take into account the skill of the ordinary artisan nor does it adequately consider what the prior art as a whole would have suggested to that ordinary artisan. *See Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1566-67, 1 USPQ2d 1593, 1595-96 (Fed. Cir.), *cert. denied*, 481 U.S. 1052 (1987)(To reach a proper conclusion under § 103(a), the decisionmaker must step backward in time and into the shoes worn by a person having ordinary skill in the art when the invention was unknown and just before it was made.); *see also In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981)("The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed

[1] Appellant cites column 27, lines 57-64, but it is column 20, lines 57-64 that contain the discussed subject matter. Therefore, we assume Appellant meant to cite to column 20.

invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art."); *In re Burckel*, 592 F.2d 1175, 1179, 201 USPQ 67, 70 (CCPA 1979). "[A] reference must be considered not only for what it expressly teaches, but also for what it fairly suggests."); and *In re Bascom*, 43 CCPA 837, 230 F.2d 612, 614, 109 USPQ 98, 100 (1956)("[T]he proper inquiry should not be limited to the specific structure shown by the references, but should be into the concepts fairly contained therein, and the overriding question to be determined is whether those concepts would suggest to one skilled in the art the modification called for by the claims.").

The prior art supports the Examiner's determination that it was within the capabilities of the ordinary artisan to select known light-emitting materials to obtain a white light-emitting device. According to Egusa, "when a plurality of dye are dispersed in the first organic dye as the second organic dye, light-emission characteristics with many wavelengths can be obtained. More specifically, when the second organic dye is selected, light-emission intensities of red, green, and blue can be controlled, thereby efficiently obtaining white light emission." (Egusa, col. 26, ll. 22-28). While Egusa does not *require* the use of red, green, and blue light-emitting materials for white-light emission it is reasonable to conclude from the disclosure that it was well known to use a red-emitting material to supply red wavelengths of light, a green-emitting material to supply green wavelengths of light, and a blue-emitting material to supply the blue wavelengths of light. The references as a whole provide evidence that selection of known red, blue, and green light-emitting materials to obtain a white light-emitting layer was within the capabilities of those in the art. That red, green, and blue light-emitting materials were known in the art is evidenced from the prior art as a whole. As found by the Examiner, and not disputed by Appellant, tris(2-phenylpyridine) iridium complex ($Ir(ppy)_3$) was known to be a green-

emitting material, 4,4' –N, N' –dicarbazole-phenyl (CBP) was known to be a blue-emitting material, and DCM2 was known to be a red-emitting material. The references describe other light-emitting materials as well. The use of known materials in a known combination to achieve a known result establishes prima facie obviousness.

We also note that claim 25 does not require that the red, green, and blue light-emitting materials each contribute to the white light emission, the claim merely requires the presence of materials that can be properly described as red, green, and blue light-emitting materials. Baldo and Forrest describe organic light-emitting devices (OLEDs) containing $Ir(ppy)_3$, a green light-emitting material, with CBP, a blue light-emitting material, as a host material. Forrest further describes mixing light-emitting materials together including $Ir(ppy)_3$ as sensitizer, CBP as host, and DCM2, a red light-emitting material, as fluorescent dye (Forrest, col. 14, ll. 63-68). These materials are red, green, and blue light-emitting materials as required by the claim. Whether they produce those colors within the device is a question we need not answer, the claim does not require color production from those specific materials. Egusa indicates that it was known to produce white light with a number of light-emitting materials and it would have been obvious to select those materials for use in the devices of Baldo and Forrest and apply the correct biasing voltage when a white light-emission was desired. Claim 25 does not exclude the addition of other light-emitting materials.

Appellant's second argument, that the combination of the teachings of the references would not result in the inventive device, is based on the use in Baldo of CBP as a host rather than a blue light-emitting material and on the use in Forrest of $Ir(ppy)_3$ as a sensitizer. According to Appellant, the Examiner's proposed modification renders Baldo and Forrest unsatisfactory for their intended purposes (Brief, p. 15). We agree with the Examiner's well-stated response in the

Answer in the first paragraph of page 11 and the paragraph bridging pages 11 and 12. When white light was desired, one of ordinary skill in the art would have selected known light-emitting materials and biasing voltage to obtain white light. That CBP is used as a host material is beside the point in this context. Nor is the use of $Ir(ppy)_3$ as a phosphorescent sensitizer as taught by Forrest counter to the reasoning of the Examiner. As found by the Examiner, $Ir(ppy)_3$ emits green light in the device of Forrest (Fig. 3 peak in green light range of 500-570 nm). The use of other known green and blue light-emitting materials in the device of Forrest would have been obvious to obtain white light emission because it is known that red, green, and blue light will combine to result in white light emission.

Appellant also argues that the Examiner's "routine experimentation" analysis is flawed because the modifications to Baldo and Forrest the Examiner proposes "would render the disclosed inventions so modified unsatisfactory for their intended purpose." (Brief, p. 16; *see also* p. 24). But the intended purpose is to make a light-emitting device. It is not seen how modifying the light-emitting devices of Baldo and Forrest to emit white light would made them unsatisfactory as light-emitting devices. Appellant defines the intended purpose of Baldo as limited to achieving efficient transfer by using CBP as a host for $Ir(ppy)_3$ and the intended purpose of Forrest as enhancing the emission efficiency of DCM2 (Reply Brief, p. 10), but this focus is too narrow. The references must be considered as a whole for what they teach one of ordinary skill in the art. The teachings as a whole support the position of the Examiner.

CONCLUSION

In summary, we affirm the decision of the Examiner to reject claims 25-32 under 35 U.S.C. § 103(a).

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv) (effective Sep. 13, 2004; 69 Fed. Reg. 49960 (Aug. 12, 2004); 1286 Off. Gaz. Pat. Office 21 (Sep. 7, 2004)).

AFFIRMED

BRADLEY R. GARRIS
Administrative Patent Judge

CHUNG K. PAK
Administrative Patent Judge

CATHERINE TIMM
Administrative Patent Judge

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